

REMARKS

Claims 1-16 are currently pending in the application. Claims 1-9 are withdrawn. Claim 10 has been amended. No new matter is believed to have been added to the application.

REJECTIONS UNDER 35 U.S.C. § 103

Claim 10

The Office Action has rejected claim 10 under 35 U.S.C. § 103(a), as allegedly being obvious over U.S. Patent Publication 2002/0111267 to Christian et al. (hereinafter “the ‘267 publication”) in view of U.S. Patent 3,507,701 to Broyde et al. (hereinafter “Broyde”). Applicants respectfully disagree for the following reasons.

The ‘267 publication does not teach or suggest the use of a hydrogen tungsten bronze based electrocatalyst as recited in amended claim 10. Neither does the ‘267 publication teach or suggest the use of a tungsten based electrocatalyst for a fuel cell cathode. Broyde teaches a tungsten oxide based catalyst having a formula WO_x wherein x is greater than 2 and less than 3, but Broyde does not teach or suggest a hydrogen tungsten bronze (H_xWO_3) based electrocatalyst. In fact, Broyde states that a tungsten oxide catalyst wherein x is equal to or greater than 3.0 is not sufficiently electrically conductive for use as a cathodic reduction catalyst.

If the teachings of the ‘267 publication and Broyde were combined, the resulting combination would still not provide the hydrogen tungsten bronze based electrocatalyst for both the anode and cathode as recited in amended claim 10. In fact, Broyde specifically teaches away from such a combination by discouraging the use of a cathodic reduction catalyst having an x value of 3.

Thus, the combination of the ‘267 publication and Broyde would not have rendered the invention of amended claim 10 obvious and this rejection should be withdrawn.

Claim 11

The Office Action has rejected claim 11 under 35 U.S.C. § 103(a), as allegedly being obvious over the '267 publication and Broyde, further in view of U.S. Patent 5,470,673 to Tseung et al. (hereinafter "Tseung"). Applicants respectfully disagree for the following reasons.

For the reasons described above with respect to claim 10, neither the '267 publication nor Broyde teach or suggest the hydrogen tungsten bronze based electrocatalyst of amended claim 10 or the $H_{0.53}WO_3$ tungsten based electrocatalyst of claim 11. The Office Action further applies Tseung to this combination because the electrocatalyst in Tseung allegedly speeds up the rate of hydrogen oxidation.

For clarification, hydrogen oxidation is the reaction that occurs at the anode of, for example, a PEM fuel cell. In contrast, the reaction that occurs at the cathode is an oxygen reduction reaction. The fact that an electrocatalyst material positively affects the hydrogen oxidation reaction does not provide any substantive indication of its behavior towards an oxygen reduction reaction. Tseung teaches several metal-WO₃ catalysts. The suggested use of the electrocatalyst as a cathode material allegedly comes from Broyde, but Broyde, as discussed above, specifically teaches away from the use of a WO₃ based catalyst. Thus, there is no motivation for one of skill in the art to combine the teachings of Tseung and Broyde, or to apply that combination to the '267 publication.

Moreover, claim 10 recites that the electrocatalyst consists essentially of a hydrogen tungsten bronze based electrocatalyst. As described in the specification (see paragraph 0008 of the published application), such an electrocatalyst can function without having to employ a platinum group metal co-catalyst. In contrast, Tseung teaches the use of a Group VIII metal containing catalyst (see column 4, lines 6-24, wherein the Group VIII metal is believed to become part of the

lattice structure of the oxide, wherein the Group VIII metal is not merely a mechanical dispersion with the oxide, and wherein for nickel and cobalt, the activity of the electrodeposited material is maintained showing no leaching out of the Group VIII metal). Thus, the Group VIII metal containing catalyst of Tseung is sufficiently different from the electrocatalyst of the present invention that consists essentially of a hydrogen tungsten bronze based electrocatalyst.

Thus, one of skill in the art would not have been motivated to combine the '267 publication with Broyde and Tseung. Even if, arguendo, such a combination were made, the resulting combination would include: a) the Group VIII metal WO_3 based catalyst of Tseung having fast hydrogen oxidation activity; b) the WO_x (wherein $2 < x < 3$) cathodic reduction catalyst of Broyde; and c) the tungsten based anode catalyst of the '267 publication. Such a combination does not result in the present invention. Thus, the combination of the '267 publication, Broyde, and Tseung would not have rendered the present invention obvious and this rejection should be withdrawn.

As claims 12-16 depend from claim 11, and ultimately from amended claim 10, these claims would not have been obvious for the reasons recited above with respect to claims 10 and 11.

CONCLUSION

Applicants respectfully request entry of the amendments and consideration of the remarks herein, and that a Notice of Allowance be issued. Examiner is invited to contact the undersigned if necessary or useful to further prosecution of the application.

A credit card payment submitted *via* EFS Web in the amount of \$1,110.00, representing the fee for a large entity under 37 C.F.R. § 1.17(a)(3) is enclosed. This amount is believed to be

correct; however, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-0629.

Respectfully submitted,

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